

**Work Order ID 158024**

Tuesday, March 07, 2017 10:13:46 AM

**\*158024\***

Page 1

Item ID: D3582-1-BENT Accept **\*N900040100\*** Setup Start **\*NS1\***  
Revision ID: Stop **\*NS2\***  
Item Name: Skidtube Assembly BK117  
Start Date: 3/13/2017 Start Qty: 10.00 **\*10\*** Cust Item ID:  
Required Date: 3/15/2017 Req'd Qty: 10.00 **\*10\*** Customer:  
Reference: SCHEDULED  
Approvals: Process Plan:  Date: MAR 07 2017 Tooling: Date: Run Start **\*NR1\***  
QC: Date: SPC (Y/N): Date: Stop **\*NR2\***

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| Draw Nbr                       | Revision Nbr             |                      |         |        |              |               |               |                  |                |
| D3582                          | C                        |                      |         |        |              |               |               |                  |                |

110 0.28  
**\*110\*** BENDING MACHINE - SKIDTUBES  
CNC Bend 1 Memo 0.17  
CNC Delta 100 Bender Bend tube as per program D3582 on CNC Bender and Dwg D3582. Folio 3,  
use bending aid DT9632  
2- cut fwd end of tube as per dwg

10 0 BK17-03-08

120 0.00  
**\*120\*** QC5- Inspect part completeness to step on W/O  
QC Memo 0.03  
Quality Control

10 17-3-8

130 0.00  
**\*130\*** Identify as per dwg & Stock Location: \_\_\_\_\_  
Packaging Packaging Memo 0.02  
Packaging LOCATION : LG002

10 17-3-8

**Work Order ID 158024**

Tuesday, March 07, 2017 10:13:46 AM

**\*158024\***

Page 2

Item ID: D3582-1-BENT Accept **\*N900040100\*** Setup Start **\*NS1\***  
Revision ID: Stop **\*NS2\***  
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Start Date: 3/13/2017 Start Qty: 10.00 **\*10\*** Cust Item ID:  
Required Date: 3/15/2017 Req'd Qty: 10.00 **\*10\*** Customer:  
Reference: SCHEDULED

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start **\*NR1\***  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop **\*NR2\***

| Sequence ID/<br>Work Center ID | Operation<br>Description                    | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|---------------------------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 140                            | QC21- Final Inspection - Work Order Release | 0.00                 |         |        |              |               |               |                  |                |
| <b>*140*</b>                   |                                             |                      |         |        |              |               |               |                  |                |
| QC                             | Memo                                        | 0.17                 |         |        |              |               |               |                  |                |
| Quality Control                |                                             |                      |         |        |              |               |               |                  |                |

DAS  
21  
9-89

MAR 08 2017

# Picklist Print

Tuesday, March 07, 2017 10:17:05 AM

Page 1

Work Order ID: 158024

**\*158024\***

Parent Item: D3582-1-BENT

**\*D3582-1-BFNT\***

Parent Item Name: Skidtube Assembly BK117

Start Date: 3/13/2017

Required Date: 3/15/2017

Start Qty: 10.00

Required Qty: 10.00

Comments: IPP REV:A 14.01.17 NEW ISSUE DD VERF:JLM

| Component Item ID/<br>Item Name | Replacement<br>Item ID | Mfg/<br>Purch | Bin<br>Item | Primary<br>Location | Last<br>Location | Route<br>Seq ID | Unit of<br>Measure | Qty on<br>Hand | Qty per Kit | Total<br>Qty | Qty<br>Issued | Date<br>Issued | Status |
|---------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|
| D2962-150                       |                        | Manufactured  | No          |                     |                  | 110             | Each               | 26.0000        | 1           | 10           |               |                |        |

**\*D2962-150\***

3.540 Outer Tube, Extrud

\*\*

17-3-8

Location

Loc Qty

Loc Code

HALL

26

132753

26

10

DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                              |                          |                                                                                                                                                                                    |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                |                                               |  |                                                                                                                    |  |
|--------------------------------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ |                          | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> |                                                 | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |                                                |                                               |  |                                                                                                                    |  |
| Date :                                                       |                          | Step #:                                                                                                                                                                            |                                                 | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                |                                               |  | MRB (QSI042) Approval                                                                                              |  |
| Description Work Order Deviation                             |                          |                                                                                                                                                                                    |                                                 | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                |                                               |  | Completed By<br><br><br>Lead hand / Supervisor<br>Approval Verification<br><br><br>QC / QA Coordinator<br>Approval |  |
|                                                              |                          |                                                                                                                                                                                    |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                |                                               |  |                                                                                                                    |  |
|                                                              |                          |                                                                                                                                                                                    |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                |                                               |  |                                                                                                                    |  |
| Root Cause                                                   |                          | FAULT CATEGORY                                                                                                                                                                     |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                |                                               |  |                                                                                                                    |  |
| Environment <input type="checkbox"/>                         | <input type="checkbox"/> | No Re-verification <input type="checkbox"/>                                                                                                                                        | Pressure/Forced <input type="checkbox"/>        | Temperature/Cure <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Power Loss/Surge <input type="checkbox"/>      | Positioned Wrong <input type="checkbox"/>     |  |                                                                                                                    |  |
| Design <input type="checkbox"/>                              | <input type="checkbox"/> | Operator <input type="checkbox"/>                                                                                                                                                  | Bending <input type="checkbox"/>                | Set-up <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Folio/Program <input type="checkbox"/>         | Outside Dimensions <input type="checkbox"/>   |  |                                                                                                                    |  |
| Doc/Data <input type="checkbox"/>                            | <input type="checkbox"/> | Offset/Setup <input type="checkbox"/>                                                                                                                                              | Centre Not Concentric <input type="checkbox"/>  | BOM/Route <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Grain <input type="checkbox"/>                 | Over/Under tolerance <input type="checkbox"/> |  |                                                                                                                    |  |
| Equip/Tooling <input type="checkbox"/>                       | <input type="checkbox"/> | Supplier <input type="checkbox"/>                                                                                                                                                  | Cracks <input type="checkbox"/>                 | Broken/Damage/Defect <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Weld <input type="checkbox"/>                  | Part Incorrect <input type="checkbox"/>       |  |                                                                                                                    |  |
| Handling/Pre <input type="checkbox"/>                        | <input type="checkbox"/> | Training <input type="checkbox"/>                                                                                                                                                  | Crimp/Kink/Ripple/Wave <input type="checkbox"/> | Inspection Incomplete/Unqualified <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Wrong Stock Pulled <input type="checkbox"/>    | Part Lost/Missing <input type="checkbox"/>    |  |                                                                                                                    |  |
| Material <input type="checkbox"/>                            | <input type="checkbox"/> | Use for Testing <input type="checkbox"/>                                                                                                                                           | Cuffs <input type="checkbox"/>                  | Contamination <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Out of Sequence <input type="checkbox"/>       | Part Moved <input type="checkbox"/>           |  |                                                                                                                    |  |
| Internal Transport <input type="checkbox"/>                  | <input type="checkbox"/> | Poor Information <input type="checkbox"/>                                                                                                                                          | Crushing <input type="checkbox"/>               | Countersink <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Off-set <input type="checkbox"/>               | Drawing <input type="checkbox"/>              |  |                                                                                                                    |  |
| Tribal Knowledge <input type="checkbox"/>                    | <input type="checkbox"/> | Rushing <input type="checkbox"/>                                                                                                                                                   | Heat Treat <input type="checkbox"/>             | Cut Too Short <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Mislabeled <input type="checkbox"/>            | Finish <input type="checkbox"/>               |  |                                                                                                                    |  |
| LOA <input type="checkbox"/>                                 | <input type="checkbox"/> | Product Improvement <input type="checkbox"/>                                                                                                                                       | Wave/Twist in Tube <input type="checkbox"/>     | Instructions Incomplete/Unclear <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Fit/Function <input type="checkbox"/>          | Misread <input type="checkbox"/>              |  |                                                                                                                    |  |
| Substation <input type="checkbox"/>                          | <input type="checkbox"/> | Process Improvement <input type="checkbox"/>                                                                                                                                       | Marks/Chatter <input type="checkbox"/>          | Drill Holes <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Misaligned/off center <input type="checkbox"/> | Turning Sequence <input type="checkbox"/>     |  |                                                                                                                    |  |
| Past Expiry Date <input type="checkbox"/>                    | <input type="checkbox"/> | Manufacturing Process <input type="checkbox"/>                                                                                                                                     | OTHER :                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                |                                               |  |                                                                                                                    |  |
| Misidentified <input type="checkbox"/>                       | <input type="checkbox"/> | Past Due <input type="checkbox"/>                                                                                                                                                  |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                |                                               |  |                                                                                                                    |  |

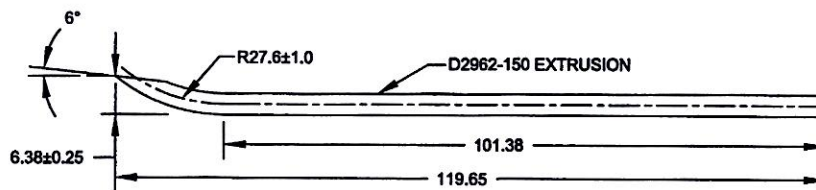


# **PARTS LIST FOR D3582-041 SKIDTUBE ASSEMBLY**

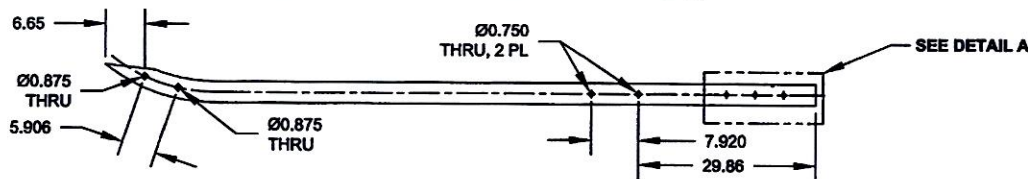
| Qty | Part Number   | Description         |
|-----|---------------|---------------------|
| X   | D3582-041     | SKIDTUBE ASSEMBLY   |
| 1   | D2962-150     | EXTRUSION           |
| 1   | D2984         | CAP                 |
| 1   | D2965         | CAP                 |
| 1   | D2971         | CROSS BOLT SPACER   |
| 1   | D3508-3       | WEARPLATE           |
| 1   | D3508-9       | WEARPLATE           |
| 1   | D3508-11      | WEARPLATE           |
| 1   | D3508-13      | WEARPLATE           |
| 1   | D3558-3       | GASKET              |
| 1   | D3558-9       | GASKET              |
| 1   | D3558-11      | GASKET              |
| 1   | D3558-13      | GASKET              |
| 1   | D3584-1       | WEB                 |
| 3   | D3682-1       | CROSS BOLT SPACER   |
| 1   | D3662-3       | CROSS BOLT SPACER   |
| 2   | D5304-1       | CROSS BOLT SPACER   |
| 36  | AELS-1032-130 | INSERT              |
| 2   | ALS7-428-165  | INSERT              |
| 28  | AN3C4A        | BOLT                |
| 2   | AN3-5A        | BOLT                |
| 2   | AN4-4A        | BOLT                |
| 28  | NAS1149C0332R | WASHER (AN960C10L)  |
| 2   | NAS1149D0332J | WASHER (AN960D10L)  |
| 2   | NAS1149D0416J | WASHER (AN960D416L) |

## **NOTES:**

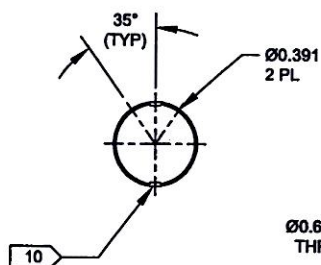
- 1) MATERIAL: N/A
- 2) FINISH: CHEMICAL CONVERSION COAT PER QSI 005 4.1 PRIOR TO INSERTING D3584-1 WEB. POWDER COAT ASSEMBLY GLOSS WHITE (REF 4.3.5.1) PER DART QSI 005 4.3. ANTI-SKID PAINT AS INDICATED TO 1.00 ABOVE CENTER LINE PER DART QSI 005 4.4
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: N/A
- 6) IDENTIFICATION: N/A
- 7) WEIGHT: 17.5 lbs
- 8) WELDING: PER DART QSI 004.
- 9) INSERT D3584-1 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241/-291 ADHESIVE PER DART QSI 015 AFTER BENDING.
- 10) USE DART DRILL TEMPLATE D78900 TO LOCATE AND DRILL Ø0.297 HOLES (36 PLACES) FOR WEARSHOE INSERTS. INSTALL AELS-1032-130 PER SECTION G-G (36 PLACES) AFTER FINISH. SEAL WEARPLATE BOLTS WITH SIKAFLEX-241/-291.
- 11) DO NOT INSTALL AN3C4A BOLTS AND NAS1149C0332R WASHERS IN INDICATED LOCATIONS.



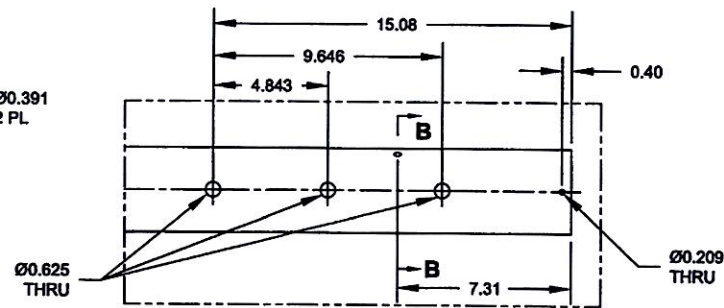
**D3582-1 BENDING AND CUTTING DETAIL**



**D3582-1 DRILLING DETAIL**



**SECTION B-B**  
SCALE 5X

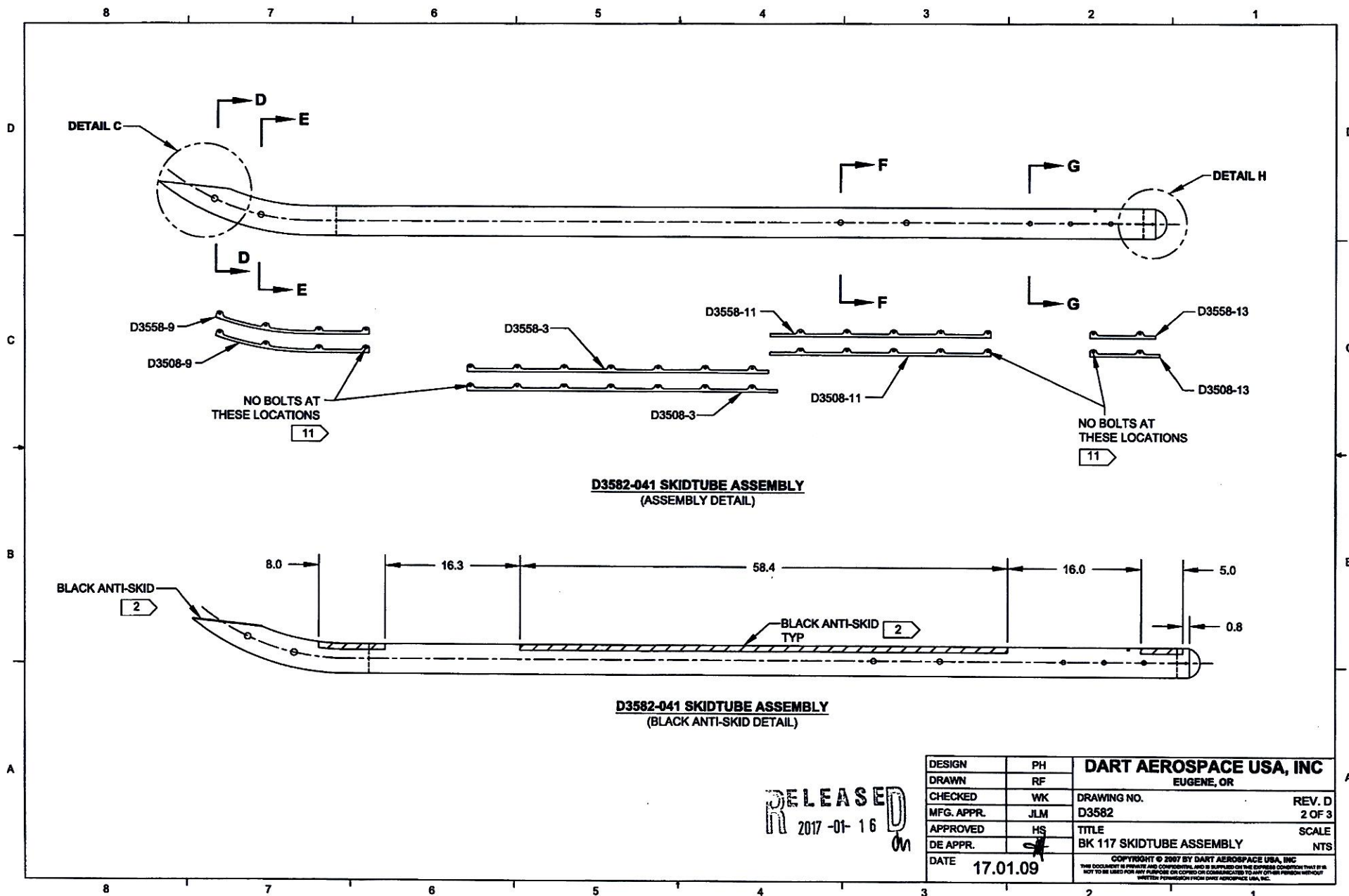


**DETAIL A**  
SCALE 5X

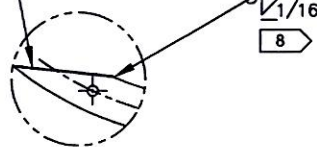
SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED  
SUBJECT TO AMEND  
WITHOUT NOTICE  
WORK ORDER  
NO. 158024  
MAR 07 2017

RELEASED  
2017-01-16  
EUN 17-506

| D          | D5304-1 WAS D2973; REVISE BOM & SECTION F-F & SECTION NOTES (ZN B7-3, A8-3); REF NCR16-6160 | RF                                                                                                                                                                                                                                                                                   | 17.01.09 |
|------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| C          | D3492 PLUG ASSEMBLIES REMOVED. REFORMAT NOTES SHT 1                                         | AP                                                                                                                                                                                                                                                                                   | 15.11.02 |
| B          | 29.86 WAS 29.87 (ZN C2-1), INCORPORATED DEO D3582-A-1 (ZN D5-1), FORMAT TO CURRENT STD      | RF                                                                                                                                                                                                                                                                                   | 15.02.20 |
| A          | NEW ISSUE                                                                                   | PH                                                                                                                                                                                                                                                                                   | 07.06.08 |
| REV.       | DESCRIPTION                                                                                 | BY                                                                                                                                                                                                                                                                                   | DATE     |
| DESIGN     | PH                                                                                          | <b>DART AEROSPACE USA, INC</b><br>EUGENE, OR                                                                                                                                                                                                                                         |          |
| DRAWN      | RF                                                                                          |                                                                                                                                                                                                                                                                                      |          |
| CHECKED    | WK                                                                                          | DRAWING NO.                                                                                                                                                                                                                                                                          | REV. D   |
| MFG. APPR. | JLM                                                                                         | D3582                                                                                                                                                                                                                                                                                | 1 OF 3   |
| APPROVED   | HS                                                                                          | TITLE                                                                                                                                                                                                                                                                                | SCALE    |
| DE APPR.   | CH                                                                                          | BK 117 SKIDTUBE ASSEMBLY                                                                                                                                                                                                                                                             | NTS      |
| DATE       | 17.01.09                                                                                    | COPYRIGHT © 2007 BY DART AEROSPACE USA, INC.<br>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE USA, INC. |          |

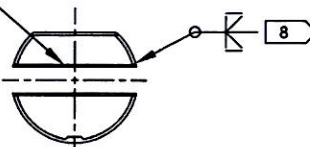


D2964 CAP  
(GRIND FLUSH)



**DETAIL C**

D2971 SPACER



**SECTION D-D**

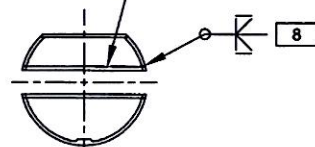
SCALE 3X

**SECTION D-D NOTES**

AFTER BENDING AND DRILLING ASSEMBLY  
PERFORM THE FOLLOWING:

1. CHAMFER HOLE 0.030 x 45°
2. INSERT D2971 SPACER
3. WELD INTO PLACE AND GRIND FLUSH
4. PASS Ø0.750 DRILL TO REMOVE SPILL OVER

D3662-3 SPACER



**SECTION E-E**

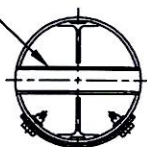
SCALE 3X

**SECTION E-E NOTES**

AFTER BENDING AND DRILLING ASSEMBLY  
PERFORM THE FOLLOWING:

1. CHAMFER HOLE 0.030 x 45°
2. INSERT D3662-3 SPACER
3. WELD INTO PLACE AND GRIND FLUSH
4. PASS Ø0.672 DRILL TO REMOVE SPILL OVER

D5304-1 SPACER  
2 PL



**SECTION F-F**

SCALE 3X  
2 PL



**SECTION F-F NOTES**

AFTER BENDING AND DRILLING ASSY  
PERFORM THE FOLLOWING:

1. INSERT D5304-1 SPACER
2. SWAGE TO Ø0.565 +0.005/-0.000 X 1.0  
DEEP PER QSI 002
3. OPEN THRU HOLE TO Ø0.625
4. GRIND FLUSH

D3584-1 WEB  
REF

D3662-1 SPACER  
3 PL

10 AFTER FINISH, INSTALL  
AELS-1032-130  
INSERT 36 PL

AN3C4A BOLT (1)  
NAS1149C0332R WASHER (1)  
28 PL

10

**SECTION G-G**

SCALE 3X

**SECTION G-G NOTES**

AFTER BENDING AND DRILLING ASSEMBLY  
PERFORM THE FOLLOWING:

1. CHAMFER HOLE 0.030 x 45°
2. INSERT D3662-1 SPACER (3 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. PASS Ø0.515 DRILL TO REMOVE SPILL OVER

AFTER FINISH, INSTALL  
ALS7-428-165 INSERT (1)  
AN4-4A BOLT (1)  
NAS1149D0416J WASHER (1)  
2 PL

8

D3584-1 WEB  
REF

AN3-5A BOLT (1)  
NAS1149D0332J WASHER (1)  
2 PL

**DETAIL H**

9

SEAL WITH  
SIKAFLEX -241/-291

D2965 CAP

|            |          |                                                                                                                                                                                                                                                                                                   |        |
|------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| DESIGN     | PH       | <b>DART AEROSPACE USA, INC</b>                                                                                                                                                                                                                                                                    |        |
| DRAWN      | RF       | EUGENE, OR                                                                                                                                                                                                                                                                                        |        |
| CHECKED    | WK       | DRAWING NO.                                                                                                                                                                                                                                                                                       | REV. D |
| MFG. APPR. | JLM      | D3582                                                                                                                                                                                                                                                                                             | 3 OF 3 |
| APPROVED   | HS       | TITLE                                                                                                                                                                                                                                                                                             | SCALE  |
| DE APPR.   |          | BK 117 SKIDTUBE ASSEMBLY                                                                                                                                                                                                                                                                          | NTS    |
| DATE       | 17.01.09 | <small>COPYRIGHT © 2007 BY DART AEROSPACE USA, INC<br/>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS<br/>NOT TO BE USED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT<br/>WRITTEN PERMISSION FROM DART AEROSPACE USA, INC.</small> |        |

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2017-01-16